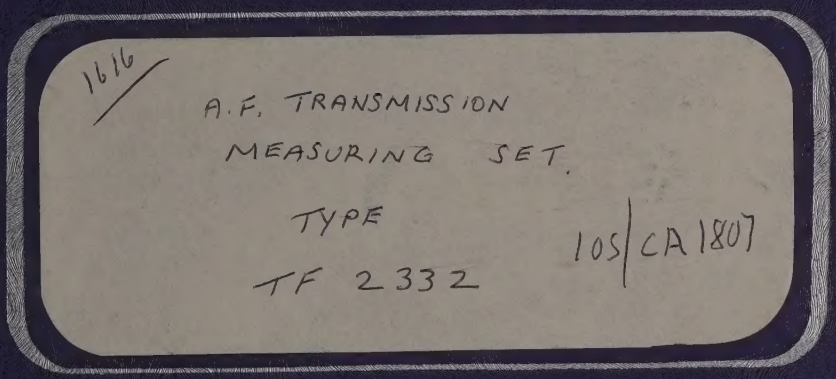
10S/CA

Operating Instructions



MARCONI INSTRUMENTS LIMITED, ENGLAND

OPERATING INSTRUCTIONS

for

A. F. TRANSMISSION MEASURING SET

TYPE TF 2332

CONTENTS

		page
1	GENERAL INFORMATION	
1.1	Introduction	3
1.2	Data Summary	4
2	OPERATION	
2.1	Controls	9
2.2	Preparation for use	10
2.3	Setting frequency	12
2.4	Setting reference level	13
2.5	Setting output	13
2.6	Standardization	14
2.7	Measuring signal level	14
2.8	Other facilities	15
3	TECHNICAL DESCRIPTION	
3.1	A.F. oscillator	16
3.2	A.F. output attenuator	17
3.3	Level meter	19
4	MAINTENANCE NOTES	
4.1	Fuses	21
4.2	Access to components	21
4.3	Cleaning rotary switches	24
4.4	Semiconductors	24
4.5	Mains transformer connections	26
4.6	Circuit voltages	26
4.7	Preset controls	28

FIGURES

Figs. 1 and 2 following page 8.

CIRCUIT DIAGRAMS AND COMPONENT LISTS

Interconnections	Drawing No. XC40071
A.F. oscillator	Drawing No. XD37506
Output attenuator	Drawing No. XD37537
Attenuator monitor	Drawing No. XD37707
Level meter	Drawing No. XD39800

1 GENERAL INFORMATION

1.1 INTRODUCTION

TF 2332 A.F. Transmission Measuring Set is a triple unit modular instrument, basically developed for testing transmission lines and programme circuits. However, it is suitable for measurements of gain, attenuation and frequency response of many types of equipment.

The three units which comprise the instrument are an oscillator covering the frequency range 20 c/s - 20 kc/s, an output attenuator giving up to 70 dB attenuation and a level meter with a measurement range of +25 dBm to -70 dBm. The combination of the oscillator and output attenuator constitute a signal source with an output level continuously variable up to +15 dBm which can be used on balanced or unbalanced 75, 150 or 600Ω systems. The voltage at the input to the attenuator is monitored by a meter with two signal level ranges. It can also be switched to monitor a.c. or d.c. voltages at an independent pair of terminals on the front panel.

Level measurements can be made over the frequency range of the oscillator, or up to 560 kc/s if required by using an alternative signal source. The level meter will terminate a circuit if necessary, or measure by bridging if the circuit is externally terminated.

Transistors are used throughout the instrument and the stabilized power supply enables a wide range of a.c. mains supply voltages to be used.

1.2 DATA SUMMARY

SIGNAL SOURCE

Frequency

Range	20 c/s to 20 kc/s in six bands
Fine control	Auxiliary fine control
Accuracy	±1% ±0.2 c/s including warm-up

Oscillator output

Power	At least +15dBm (31.6mW) into 600Ω; over 8.5V open circuit.
Control	At least 40dB range of attenuation, by continuously variable T-network.
Impedance	600Ω ±20% unbalanced

Attenuator

Range	70dB in 10dB and 1dB steps
Accuracy	20 c/s - 20 kc/s: ±1% of dB setting ±0.2dB
Internal load	Switched internal matching termination
Output impedance	Unbalanced, 600Ω Balanced or unbalanced, 600Ω, 150Ω and 75Ω via transformer.

Balanced output

Balance accuracy	Better than 52dB at 600Ω Balanced up to at least 10kc/s (with centre-tap earthed).

DATA SUMMARY (continued)

Distortion	
Unbalanced output	Less than 0.05% from 63 c/s to 6.3 kc/s Less than 0.1% from 20 c/s to 63 c/s and 6.3 kc/s to 20 kc/s.
Balanced output	With matched load, the distortion is less than: 0.1% from 50 c/s to 20 kc/s 0.3% from 30 c/s to 50 c/s
Hum	Less than 0.01% (-80dB) of output signal, or -90dBm, whichever is the greater.
Output Meter	
Ranges	Meter graduated -6 to +6dBm Range switch 0 and +10dBm
Accuracy at 0 dBm	At 0 dB setting, using 600Ω Unbalanced output: ±0.25dB when standardized at 1 kc/s.
	At 1 kc/s: ±0.25 dB at 600Ω unbalanced, with an additional ±0.3 dB at other impedances.
STANDARDIZE METER control	Panel preset allows re-standardization at any impedance
Frequency response (relative to 1 kc/s)	±0.2 dB, 20 c/s - 20 kc/s
Voltmeter	
Ranges	0.1V, 1V, 50V and 500V d.c. 10V a.c. (power line frequencies)
	Also percentage scale calibrated ±50% relative to 0.5V d.c.
Accuracy	±5% of full scale

DATA SUMMARY (continued)

LEVEL METER

Frequency

Range	20 c/s to 560 kc/s
Response (relative to 1 kc/s)	At 0 dBm: 20 c/s - 50 c/s, +0.25 dB -0.5 dB 200 c/s - 20 kc/s, ±0.1 dB 50 c/s - 100 kc/s, ±0.25 dB 100 kc/s - 300 kc/s, ±0.25 dB (75 and 150Ω only) 300 kc/s - 560 kc/s, ±0.5 dB (75 and 150Ω only)
Range switching accuracy	Up to 100 kc/s: ±0.3 dB, +20 to -50 dBm ±0.5 dB, -60 dBm Up to 560 kc/s: ±0.5 dB, +20 to -50 dBm ±1 dB, -60 dBm (75 & 150Ω only)

Level Measurement

Range	+25 to -70 dBm
Accuracy	At 1 kc/s: Can be standardized against signal source at 0 dBm

Input

Terminated impedance	Balanced: 600 and 150Ω Unbalanced: 600 and 75Ω
Unterminated impedance	-10 to -60 dBm ranges: at least 15kΩ unbalanced at least 30kΩ balanced 0 to +20 dBm ranges: 100kΩ unbalanced 200kΩ balanced

DATA SUMMARY (continued)

Input (continued)

Maximum input	100V peak or $\frac{1}{2}$W (whichever is more significant) between terminals or between terminals and chassis.
Meter scale shape	Accuracy relative to 0 dB: ±0.1 dB per 1 dB increment between +5 and -5 dB
Rejection of common signals on balanced lines	At 1 kc/s: At least 52 dB below 0 dBm levels at least 40 dB above 0 dBm levels At 560 kc/s: At least 34 dB at all levels with max voltage limitations:- -10 to -60 dBm ranges, 0.5V r.m.s. 0 to +20 dBm ranges, 70V r.m.s. at 50 c/s. 14V r.m.s. at 560 kc/s.

Amplifier Output

Level	Approximately 85mV r.m.s. when meter reads 0 dBm.
Impedance	Nominally 1kΩ

GENERAL

Power Supply

Mains Operation	190V - 260V	45 c/s to 500 c/s
	95V - 130V	45 c/s to 500 c/s
	210V - 260V	500 c/s to 1000 c/s
	105V - 130V	500 c/s to 1000 c/s
Maximum consumption	10 V.A	

Dimensions and Weight	Height	Width	Depth	Weight
	$7\frac{1}{2}$ in (19 cm)	$18\frac{1}{2}$ in (47 cm)	12 5/8 in (32 cm)	31 lb (14.1 kg)

Accessories supplied

Mains lead

Two unbalanced output leads

Two balanced output leads

Accessories available

TM 7010 Rack-mounting case.

EB 2332
1 - 11/64

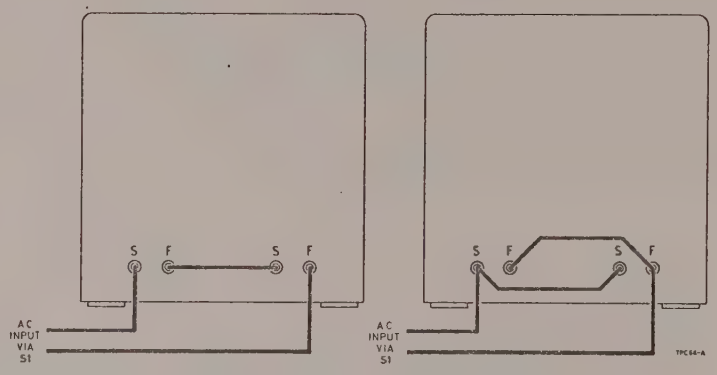


Fig. 1

Fig. 2

Transformer Primary Connections

2 OPERATION

2.1 CONTROLS

(1) Frequency control and dial. Set for required signal frequency. Use A or B scale on dial according to range switch setting.

(2) FINE TUNE control. For making small uncalibrated frequency adjustments.

(3) Oscillator Output terminals. In circuit only when the OUTPUT switch is set to the right.

(4) OUTPUT switch. The oscillator output is routed by this switch to either the Oscillator Output terminals or to the OUTPUT ATTENUATOR via plug and socket connections on the rear panel.

(5) SET OUTPUT control. Adjusts oscillator output level.

(6) SUPPLY switch. Switches on the oscillator and output attenuator when turned clockwise.

(7) Attenuator Input meter. Indicates the signal level in dBm (red scale), at the attenuator input, or the a.c. or d.c. voltage at the voltmeter terminals.

(8) METER RANGE selector. Selects the function and range of the Attenuator Input meter.

(9) Ω LOAD IMPEDANCE selector. Selects the output impedance of the attenuator.

(10) Termination switch. When switched to STANDARDIZE a terminating resistor is connected corresponding to the impedance selected by the Ω OUTPUT IMPEDANCE selector.

(11) STANDARDIZE METER preset. For adjusting the Attenuator Input meter against an external standard (in conjunction with Termination switch.)

(12) ATTEN switches. The attenuation introduced is the sum of the two dial readings.

CONTROLS (continued)

(13) Attenuator Output terminals. Provide a variety of balanced or unbalanced outputs as determined by the Ω LOAD IMPEDANCE selector and the use or otherwise of the earth and transformer centre tap terminals.

(14) VOLTMETER INPUT terminals. For d.c. and a.c. voltage measurements.

(15) LEVEL METER. Calibrated from -15 to +15 dBm.

(16) SET CAL control. For standardizing the sensitivity of the LEVEL METER.

(17) RANGE dBm switch. The input level to the LEVEL METER is given as the sum of the setting of this switch and the meter reading.

(18) LOAD IMPEDANCE selector. Set to the impedance of the equipment under test.

(19) LOAD switch. When set to INT a terminating load corresponding to the impedance selected by the LOAD IMPEDANCE selector is connected across the INPUT terminals.

(20) INPUT terminals. The terminal marked with an earth symbol is earthed only when the LOAD IMPEDANCE switch is turned to one of the UNBAL positions.

(21) AMPLIFIER OUTPUT terminals. Approximately 85mV is available when the meter read 0 dBm.

(22) SUPPLY switch. Switches on the level meter when turned clockwise.

2.2 PREPARATION FOR USE

The instrument is intended to be operated primarily from a.c. mains supplies, but can also be operated from batteries if desired.

Two separate power supplies are provided; one on the oscillator chassis, the other on the level meter chassis. The oscillator unit provides the d.c. supply to the attenuator.

2.2 (continued)

A.C.POWER SUPPLY

Normally the two mains transformers have their windings arranged to accept supply voltages in the range 190 - 260V see Fig. 1. If voltages in the range 95 - 130V are to be used the windings must be reconnected as shown in Fig. 2, and the 100mA mains fuses replaced by 250mA types.

To gain access to the transformers remove the case and hinge open the oscillator and level meter chassis - see section 4.2.

Attach a suitable 3 pin plug to the mains lead. Note that the wires may be colour coded in either of the following ways:

(a)	Earth (ground)	-	Green
	Neutral	-	Black
	Line (phase)	-	Red
(b)	Earth (ground)	-	Green/yellow
	Neutral	-	Black
	Line (phase)	-	Blue

In addition the earth wire carries a yellow sleeve bearing a green earth symbol and the neutral wire carries a sleeve marked N.

Before connecting the supply set the SELECTOR switches, situated at the rear of the oscillator and level meter units, to MAINS.

D.C.POWER SUPPLY

Two d.c. supplies can be used, if absolutely necessary, instead of the mains supply.

A supply of 18 to 30V is required for the level meter unit and a supply of 65 to 85V is required for the oscillator unit.

Set both SELECTOR switches to BATTERY and connect the supplies by leads to the pairs of terminals just below the switches.

2.2 (continued)

METER MECHANICAL ZEROS

Before turning the supply switches on check that the mechanical zeros of the meters are correctly set.

2.3 SETTING FREQUENCY

The oscillator can be used within a few seconds of switching on but if the best stability is required it should be allowed to settle down for a minute or two.

To tune the oscillator to a particular frequency:-

(1) The positions of the Frequency Range selector fall between two figures and are marked with A or B. Select a position giving the frequency band necessary and read from the dial scale corresponding to the latter.

(2) Set the Frequency dial to indicate the required frequency.

(3) Set the FINE TUNE control to mid-travel. This position is marked with a dot.

(4) Set the OUTPUT switch to REAR if the output attenuator is to be used.

Example: To obtain a frequency of 3.5 kc/s:

Set the Frequency Range selector to the position between figures 2k and 6.3k. Set the Frequency dial to 35 on Scale A.

Because transistors are used the tuning elements in the oscillator are variable resistors. They are ganged and are wire-wound types giving the greatest calibration accuracy. It should be noted, however, that during tuning some fluctuation in output level may occur due to the moving contacts passing over the turns of wire. As soon as movement ceases the output will stabilize at its original level.

For small uncalibrated adjustments to frequency use the FINE TUNE control.

2.4 SETTING REFERENCE LEVEL

(1) Set the Ω LOAD IMPEDANCE selector to the position required to match the equipment under test, or to 600 DIRECT UNBAL if feeding into a high impedance.

(2) Set the METER RANGE selector to +10 dBm and the Termination switch to STANDARDIZE.

(3) Turn the SET OUTPUT control clockwise until the Attenuator Input meter reads 0 dBm. The settings of the ATTEN switches will now be in dBs below +10 dBm. (This is the best method, unless levels below -60 dBm are required, because the coarseness of the SET OUTPUT control at the bottom of its range makes it very difficult to set 0 dBm exactly). Also all meter readings must have 10 dBm added to them (i.e. -6 dBm point becomes +4 dBm point).

Note that an external load must not be connected to the attenuator output while the reference level is being established, unless the Termination switch is set to MONITOR and an external load used.

2.5 SETTING OUTPUT

(1) Connect the equipment to be tested to the UNBAL OUT or BAL OUT terminals as required. Note that if output impedances of 75Ω or 150Ω unbalanced are required, one of the BAL OUT terminals should be earthed.

(2) Set the Termination switch to MONITOR (unless feeding into a high impedance) and turn the ATTEN switches until the required output level is realized. The amount of attenuation is the sum of the two dial readings.

If the meter reading changes when attenuation is introduced or removed do not reset the reference level as the effect is in the monitoring circuit only.

If the +10 dBm reference point is used the meter reads directly signal levels between +4 dBm and +16 dBm (i.e. with the ATTEN switches set to 0 dB).

2.6 STANDARDIZATION

The sensitivity of the attenuator is standardized during manufacture at 0 dBm, 1 kc/s, 600 Ω unbalanced. It can be checked in the following way:-

(1) Set the Ω LOAD IMPEDANCE switch to 600 DIRECT UNBAL, the METER RANGE switch to 10 dBm, the ATTEN switches to 10 dBm and the Termination switch to STANDARDIZE.

(2) Introduce 10 dB attenuation with the ATTEN switches and connect a sub-standard voltmeter across the UNBAL OUT terminals.

(3) Tune the oscillator to 1 kc/s and adjust the SET OUTPUT control until the sub-standard meter indicates 0.775V.

(4) If necessary adjust the STANDARDIZE METER preset control until the Attenuator Input meter indicates 0 dBm.

A similar procedure may be used if it is required to standardize at other levels than 0 dBm, frequencies, or impedances.

The internal load is accurate to ±1%. If greater accuracy is required an accurate external load must be used. In this case the above procedure is applicable except that the Termination switch should be set to MONITOR and the load connected across the UNBAL OUT terminals in parallel with the sub-standard voltmeter.

If a 600Ω milliwattmeter is used instead of a sub-standard voltmeter the Termination switch should be set to MONITOR, the milliwattmeter providing the necessary load.

2.7 MEASURING SIGNAL LEVEL

Switch on the level meter by turning the SUPPLY switch clockwise.

The level meter should be standardized before a series of tests and from time to time during the tests, particularly if the impedance is altered. Use the following procedure:-

(1) Tune the oscillator to 1 kc/s and adjust it for an output of10 dBm as described under SETTING REFERENCE LEVEL.

(2) Set the Ω LOAD IMPEDANCE switch and the level meter LOAD IMPEDANCE switch to the impedance to be used.

2.7 (continued)

(3) Set the attenuator Termination switch to MONITOR, the RANGE dBm switch to 0 dBm, the level meter LOAD switch to INT and connect the attenuator OUTPUT terminals to the level meter INPUT terminals.

(4) Adjust the SET CAL control until the meter indicates 0 dBm.

If the level meter is to be used for bridging measurements across a terminated line the LOAD switch should be set to EXT. If it is to be used for measurements on an unterminated line the LOAD switch should be set to INT, in which case a terminating load is connected corresponding to the setting of the LOAD IMPEDANCE switch.

Set the LOAD IMPEDANCE switch to match the equipment under test, the RANGE dBm switch to +20 dBm and connect the equipment to the INPUT terminals. Turn the RANGE dBm switch anticlockwise until the meter pointer is deflected onto the more accurate part of the scale (if possible). The signal level is the sum of the RANGE dBm and meter-scale readings.

2.8 OTHER FACILITIES

A.C./D.C. voltmeter

The attenuator input voltmeter has scales enabling it to be used for measuring a.c. or d.c. voltages. In addition a percentage is provided showing changes of up to ±50% relative to the half-scale values of the d.c. voltage ranges.

Connect the circuit to be tested to the VOLTMETER INPUT terminals and set the METER RANGE switch to give a convenient scale reading.

Amplifier output

The level meter amplifier is brought out to a pair of terminals on the front panel. The output level is about 85 mV when the meter is reading 0 dBm and the output impedance is about 1 kΩ.

3 TECHNICAL DESCRIPTION

3.1 A.F.OSCILLATOR

Basically, the A.F.Oscillator consists of a multistage transistor amplifier, two overall feedback loops creating and stabilizing oscillation, and an attenuator controlling the output. The circuit arrangement is shown in the block diagram, Fig. 3.1. The instrument also contains power supply circuits.

The first stage of the amplifier employs transistor VT5 in a common-collector or emitter-follower circuit. This is a current amplifier taking as input the net signal derived from the two feedback paths. The transistor used here is a silicon n-p-n type, as are all the others in the amplifier.

The voltage gain in the system is provided by the second stage, VT6. In this, a common-emitter circuit produces high gain as a result of a high effective a.c. collector load impedance obtained by a bootstrap arrangement; the collector load resistor is not fed directly from the d.c. supply but via the emitter of an auxiliary transistor, VT7, driven from a further point in the amplifier chain.

Two successive emitter-followers, VT8 and VT9, amplify the signal current. At the output of the first, the auxiliary transistor VT7 receives its drive; and also at this point diode limiter MR6 is connected, to control the amplitude of initial oscillations at switch-on. The second emitter-follower, VT9, drives the output stage.

In the final stage, a low source impedance and low distortion output are provided by a shunt-regulated emitter-follower, VT10 and VT11. The two paths of a.c. feedback derive their signals from the output of this stage. Beyond, the low output impedance is padded up by resistance to present a constant and suitable value of source for the output level control circuit. The output stage has its working conditions stabilized by d.c. negative feedback, returned from it to the first transistor of the amplifier, all the transistors being d.c. coupled.

The output level of the A.F.Oscillator is determined by a 600Ω T-network attenuator connected to the front panel terminals and also to a rear coaxial outlet, SKT2. This is a continuously variable control, uncalibrated. The rear outlet is intended to facilitate linking to associated equipment, particularly Monitored A.F. Attenuator Type TF 2160 and A.F. Output Attenuator Type TM 6843.

3.1 (continued)

Two a.c. feedback paths exist between the output of the final stage and the input of the first stage of the amplifier.

One of these determines the frequency of oscillation by providing positive feedback at a chosen frequency through a variable parallel-T network. This network has continuously variable resistors RV6a to RV6c which are ganged together and form a tuning control over a frequency band, and switched capacitors, C17 to C29, enabling a series of six bands to be covered. At frequencies above and below the chosen frequency phase changes in the network cause the feedback to be negative; this provides a considerable measure of harmonic distortion suppression.

The other a.c. feedback path conveys negative feedback at all frequencies. At the selected frequency of oscillation it is overcome by the positive feedback at the junction where the two feedback paths enter the amplifier. This wide-band negative feedback is derived from two successive resistive potentiometers at the output of the amplifier. In the first potentiometer, thermistor TH1 occupying the upper arm is sensitive to the level of output and varies its resistance, and therefore varies the negative feedback, so that the level of output is stabilized, and also so that the strength of oscillation is always moderate (and therefore generates a minimum of distortion). In the second potentiometer, a physically larger thermistor, TH2, in the lower arm is primarily sensitive to ambient temperature and compensates for the effect of this on the first thermistor.

The a.f. oscillator has a mains transformer and a full-wave rectifier circuit, feeding the instrument through a series regulating circuit employing p-n-p transistors, VT1 to VT4.

On the mains transformer, T1, are two primary windings, which can be linked in series or parallel to permit operation from a.c. supplies giving between 190 and 260V or between 95 and 130V respectively.

Terminals and switch S2 at the rear allow the input of the regulating circuit to be fed from an external d.c. source. A series semiconductor diode, MR1, protects the instrument against the application of the wrong polarity.

3.2 A.F. OUTPUT ATTENUATOR

The a.f. output attenuator comprises three divisions: an input voltmeter, a 70dB step attenuator, and an output circuit including a multi-ratio matching transformer.

3.2 (continued)

INPUT VOLTMETER

Transistors VT1 and VT2 are the basis of the input voltmeter. They are connected as cascaded emitter followers in order to provide a high input impedance. Diodes MR1 and MR3 form a voltage doubling circuit which rectifies and feeds the meter M1 on the two signal-voltage ranges. M1 is also the monitor for a simple a.v. and d.v. voltmeter in the other positions of the METER RANGE selector - input is via the front panel VOLTMETER INPUT terminals.

70dB STEP ATTENUATOR

The step attenuator provides a total of 70dB attenuation in two ranges. These give 1dB increments up to 10dB and thence 10dB increments up to 70dB. The lower range can also be switched to completely break the signal path through the instrument.

The 10dB range uses four symmetrical T-networks and the 60dB range, three. These are switched into circuit alone or in various series combinations as shown in Table 3.1. Each has a characteristic impedance of 600Ω.

Total attenuation dB	Pad sections in circuit 1dB step range	Total attenuation dB	Pad sections in circuit 10dB step range
0	Nil	0	Nil
1	1	10	10
2	2	20	20
3	2 + 1	30	30
4	4	40	30 + 10
5	4 + 1	50	30 + 20
6	4 + 2	60	30 + 20 + 10
7	4 + 3		
8	4 + 3 1		
9	4 + 3 2		
10	4 + 3 2 + 1		

Table 3.1. T-network switching

3.2 (continued)

OUTPUT CIRCUIT

The characteristic impedance of the basic attenuator is 600Ω unbalanced. A transformer, T1, is used, therefore, to obtain balanced output impedances of 600, 150 and 75Ω. In the 600Ω DIRECT UNBAL output condition the transformer is by-passed, but a pad, R16, R17 and R18, is inserted to simulate its insertion loss. R19 provides the switched internal load - only one resistor being necessary because it is switched in across the primary of T1.

3.3 LEVEL METER

This unit is essentially an amplifier-rectifier type of voltmeter preceded by a differential amplifier. Range switching is carried out using three distinct methods in order to preserve a good signal to noise ratio. These are a 50 dB attenuator at the input which is switched in on the three least sensitive ranges, a potentiometer having five 10 dB steps between the differential amplifier and the main amplifier; a 10 dB reduction of the feedback applied to transistor VT7 to obtain the most sensitive range. At the input, resistors can be switched in as matching terminations.

DIFFERENTIAL AMPLIFIER

Transistors VT4 and VT5 are arranged as a long tailed pair which always gives an unbalanced output from either balanced or unbalanced inputs. The tail consists of VT6 which has its bias controlled by Zener diode MR11 and thus gives constant current operation.

Protection against overload by high value a.c. inputs is given by diodes MR5 to MR10, which are normally reverse biased, in conjunction with resistors R17 and R18.

MAIN AMPLIFIER

The first stage, VT7, has its gain adjusted by variation of feedback to achieve sensitivities corresponding to the different input impedances selected by the LOAD IMPEDANCE switch.

VT8 is an emitter follower, direct-coupled to VT9 which operates as an amplifier. Variable resistor RV3, the SET CAL control, varies the negative feedback in the emitter circuit and so controls the gain of VT9. VT10 is another amplifier stage, with the preset control RV2 in the emitter circuit to allow the bias conditions of the output stage to be set up. The output stage consists of a complementary p-n-p - n-p-n push-pull pair (VT11 and VT12).

3.3 (continued)

In addition to local a.c. feedback a d.c. negative feedback path over the whole of the direct coupled part of the amplifier is used to stabilize the transistor working points.

The junction of the collectors of VT11 and VT12 serves as the principal output and feeds the meter bridge detector circuit. A subsiduary output is taken from the emitter of VT11 and brought to the front panel terminals for monitoring purposes.

4 MAINTENANCE NOTES

This part of the handbook is for guidance where it is most needed in servicing the instrument. In casesof difficulties that cannot be resolved with the aid of this book, or for advice on maintaining the instrument, please write or phone our Service Division, or nearest Area Office, or Agent. Always mention the type number and serial number of your instrument (for addresses see rear cover).

4.1 FUSES

Four fuses are fitted to protect the power supply circuits. All are standard 20 mm x 5 mm components and are accessible at the rear of the instrument; two on the oscillator unit and two on the level meter unit. FS1 in the oscillator mains circuit is a quick acting type whilst the others are time lag types. Suitable replacements are indicated in table 4.1.

TABLE 4.1

FUSE	RATING	TYPE
Oscillator		
FS1	100 mA (190 - 260V)	Beswick TDC13/100mA
	250 mA (95 - 130V)	Beswick TDC13/250mA
FS2	250 mA	Beswick TDC123/250mA
Level Meter		
FS1	100 mA (190 - 260V)	Beswick TDC123/100mA
	250 mA (95 - 130V)	Beswick TDC123/250mA
FS2	250 mA	Beswick TDC123/250mA

4.2 ACCESS TO COMPONENTS

Removing case

(1) Remove the six coin-slotted screws at the rear of the instrument and lift off the rear panel. Disconnect the mains lead from the junction box.

(2) Press the instrument forward until it is free from the case.

4.2 (continued)

Separating the units

(1) Pull out the mains free sockets from the plugs on the oscillator unit and on the level meter unit.

(2) Remove the six screws securing the cross-member to the individual units and lift it off.

(3) Disconnect the twin h.t. lead and the coaxial signal lead that join the attenuator and the oscillator.

At this point the oscillator and level meter chassis can be hinged open and the bottom cover of the attenuator unit removed. If, however, more complete access is required the appropriate unit must be taken out.

(4) To remove a unit completely, remove the countersunk screws, two at the top and two at the bottom, which hold the unit in question to the front panel surround.

Opening chassis

The chassis of the oscillator and level meter consist of a front panel and three other sections hinged to it. The four sections are normally arranged in the form of a rectangle when viewed from above, and are held in this position by screws. The sections can be hinged open as follows:

(1) Underneath, near the rear, slacken the two 6 BA screws in slots, one at each side of the web that spans the chassis.

(2) Slacken the two relatively large screws at one side of the rear section until the shoulders under their heads are clear of the slots through which they pass. It should then be possible to separate the chassis at this corner and to open it out.

Dismantling attenuator unit

(a) Input voltmeter box

To give access to the components in the voltmeter box (behind the voltmeter range switch), remove the two 6BA screws that hold the side cover of the unit and take off the cover.

The two boards carrying the majority of the components are held in position by the four, outer, corner screws in the larger board.

4.2 (continued)

(b) Output box

To obtain access to the components in this box remove the two 6BA screws holding its side cover and take off the cover.

(c) Attenuator box

When the case is removed, the components of the attenuator can be examined and limited access can be obtained by removing the bottom cover of the attenuator box. To do this remove the ten 6BA screws that hold it, underneath the instrument.

To remove the attenuator box completely:-

(1) Remove the bottom cover of the box as described above.

(2) Slacken the 4BA socket-headed set screws in all the control knobs and remove the knobs.

(3) Disconnect the meter, release the meter clamp (behind the front panel), and remove the meter.

(4) Remove the front panel mask - now free.

(5) Remove the side cover of the voltmeter box, by first removing the two screws that hold it, and unplug the coaxial connector to the attenuator box.

(6) Disconnect from the front panel terminals, and from the attenuator, the leads that enter the attenuator unit through a hole near the front. Also, unsolder the connection to the front panel earth terminal.

(7) Slacken the screw entering the output unit, and remove the screw entering the attenuator unit, in the small bar joining the rear of the two units. Swing the bar aside.

(8) Unscrew and remove the hexagonal bushes netween the front panel and the attenuator box, which will then be freed.

When the attenuator box is separated from the instrument, the sides can be detached by withdrawing the screws and nuts that hold them.

4.3 CLEANING ROTARY SWITCHES

If it is necessary to clean the contacts of any of the rotary switches, this should be done with benzine (not carbon tetrachloride), and the contacts should afterwards be wiped with a suitable lubricant, such as Electrolube No. 1, manufactured by Electrolube Ltd., Slough, Bucks, England.

4.4 SEMICONDUCTORS

A. F. OSCILLATOR

Circuit Reference	Type	Alternatives
VT1, VT2, VT3	GET111	-
VT4	2N1531	OC36, NKT403 2N458
VT5	2S703	-
VT6, VT7 VT8	2S104	-
VT9	2S103	-
VT10, VT11	2N696	-
MR1, MR7	1N540	1S103, 40AS DD226, SJ402F VA724
MR2, MR3	DD058	-
MR4, MR5	ZB18	
MR6, MR8	IN63	OA95, HG1005 IG26

4.4 (continued)

OUTPUT ATTENUATOR

Circuit reference	Type	Alternatives
VT1, VT2	2N1748A	-
MR1, MR3	GEX66	-
MR2, MR4	1N63	OA95, HG1005, 1G26

LEVEL METER

Circuit reference	Type	Alternatives
VT1	2N404	-
VT2	ACY17	-
VT3	OC25	2N2063
VT4 VT5. VT7	2N1748A	-
VT6, VT8, VT10, VT11	2G403	-
VT9, VT12	BSY26	-
MR1, MR2, MR3	1N540	1S103, 40AS, DD226, SJ402F VA724
MR4	Z10	-
MR5. MR6, MR7, MR8, MR9, MR10	MS2-H	-
MR11	Z6.8	-
MR12	Z6.2	-
MR13, MR14	CG91-H	-

4.5 MAINS TRANSFORMER CONNECTIONS

To make adjustment to transformer connections, remove the case and hinge open the oscillator and the level meter chassis as described in section 4.2.

For supply voltages between 190V and 260V each transformer must have its primary windings in series.

For supply voltages between 95V and 130V each transformer must have its primary windings in parallel.

4.6 CIRCUIT VOLTAGES

The following voltages are those which may be expected on a typical TF 2332 at a mains input of 230V, using a 20kΩ/volt meter.

A.F. OSCILLATOR

Transistor terminals

Power supply circuit voltage relative to positive d.c. supply line (tag 12 on amplifier board TM 6879).

Transistor	Emitter	Base	Collector	See Note
VT1	-36	-36	-56	
VT2	-56	-56	-87	A
VT3	-56	-56	-87	A
VT4	-56	-56	-87	A

At each tag '3' on transformer T1: 80V a.c. See note A

NOTE A: the voltages at the collectors of VT2, VT3 and VT4, and on T1, are dependent on the a.c. supply voltage. The values given are those to be expected if the value of the supply voltage is the mean of the range for which the instrument is set.

4.6 (continued)

Transistor terminals

Amplifier transistor voltages relative to negative d.c. regulated supply line (tag 9 on amplifier board TM 6879).

Transistor	Emitter	Base	Collector	See Note
VT5	2	2.6	17	
VT6	2	2.2	29	
VT7	33.5	35	55	
VT8	28.8	29.2	55	
VT9	28	28.6	55	
VT10	27.5	28	53.2	B
VT11	1.9	2.4	26.7	

NOTE B: Emitter voltage of VT10 is set by RV4; see Section 4.7.

A.F. OUTPUT ATTENUATOR

Transistor terminals

Voltages relative to positive d.c. supply line (tag 20 on board TM 7060)

Transmitter	Emitter	Base	Collector
VT1	4.55	4.5	8
VT2	4.3	4.55	8

4.6 (continued)

LEVEL METER

Voltages relative to positive d.c. supply line (tag 9 on board TM 7114)

Transistor terminals

Transistor	Emitter	Base	Collector
VT4	6.0		12.5
VT5	5.8		10.1
VT6	1.9	2.1	5.3
VT7	6.1		9.7
VT8	7.1	7.3	15
VT9	7.8	7.2	4.3
VT10	4.2	4.5	10
VT11	3.8	4.2	7.5
VT12	10.7	10.8	7.5

Circuit points

Point	Voltage
Tag 19	15
Tag 17	14

4.7 PRESET CONTROLS

A.F.OSCILLATOR

Although small adjustments can be made to any of the presets RV1 - RV5 alone, it is preferable to check and, if necessary, adjust them all in the following order: RV1, RV4, RV3 and RV5.

Set h.t.

Resistor RV1 sets the stabilized d.c. supply feeding the amplifier. The potential should be +55V at tag 9 with respect to tag 12 on the right-hand printed board TM 6879.

4.7 (continued)

Amplifier gain

Resistor RV3 sets the gain of the amplifier. This should be 400 between test points TP1 and TP2 on the right-hand printed board TM 6879, measured as follows:-

(1) Disconnect the positive feedback at tag 11 on the component side of the board.

(2) Apply 25mV at 1 kc/s from a 600Ω source to TP1 on the wiring side of the board.

(3) Read the output on a valve voltmeter connected to TP2 on the wiring side of the baord, using tag 21 as earth. Adjust RV3, if necessary, to obtain 10V r.m.s.

RV3 may need adjustment if any of the transistors VT5 to VT11 are changed, particularly VT6.

Minimum distortion

Distortion in the output can be minimized by means of potentiometer RV4. It also varies the positive d.c. voltage at test point TP2 on the right-hand printed board (wiring side), TM 6879, relative to tag 9 (component side). This voltage must lie in the range 26 - 29V when RV4 has been set.

RV4 may need readjustment if any of the transistors VT5 to VT11 are changed.

Level stabilization

Variable resistor RV5, forming part of the level-sensitive potentiometer network, adjusts the level setting negative feedback. Adopt the following procedure:

(1) Set the instrument so that it is oscillating normally at 1 kc/s.

(2) Check the voltage at test point TP2 on the right-hand printed board (wiring side), TM 6879, relative to tag 21 (component side), using an electronic voltmeter. It should be 11V r.m.s.

RV5 may need readjustment if either of the thermistors TH1 or TH2 is changed.

4.7 (continued)

Resistors RV8 - RV19

These set the limits of the frequency bands. Normally, they should not be moved.

A.F. OUTPUT ATTENUATOR

Only the meter circuit in the a.f. output attenuator has preset controls. Adjustment of the front panel preset control STANDARDIZE METER is described in section 2.6.

To gain access to the other presets remove the plastic plate beneath the trimming-hole mask on the top of the voltmeter box, after removing the screws at the corners of the mask (one screw at the rear can be left in position, but slackened, and the plastic plate swung clear).

Signal level ranges

(1) Turn the METER RANGE switch to 0 dBm. Apply to the attenuator inlet a 1 kc/s sine wave; adjust this input to 0.775V, measured on an external standardized voltmeter, and set RV1 so that the meter on the attenuator indicates 0 dBm exactly.

(2) Apply a 550 kc/s sine wave to the attenuator; adjust the input to 0.775V, measured on the external standardized meter, and set C1 so that the meter on the attenuator indicates 0 dBm.

(3) Turn the METER RANGE switch to +10 dBm and repeat (1) and (2) with an input of 2.45V, measured on the external standardized meter; but adjust RV2 and C2 at 1 kc/s and 550 kc/s respectively, for an indication on the attenuator of +10 dBm exactly.

Alternating voltage range

Turn the METER RANGE switch to 10V a.c. Apply a 1 kc/s sine wave to the VOLTMETER INPUT terminals and adjust the level to 10V r.m.s. measured on an external standardized meter. Adjust RV3 for exactly 10V indication on the attenuator meter.

4.7 (continued)

LEVEL METER

Set h.t.

Connect a voltmeter between tags 7 and 9 of the power unit board with tag 9 positive. Apply a 230V supply and switch on. Adjust RV1 until the voltmeter indicates 15V.

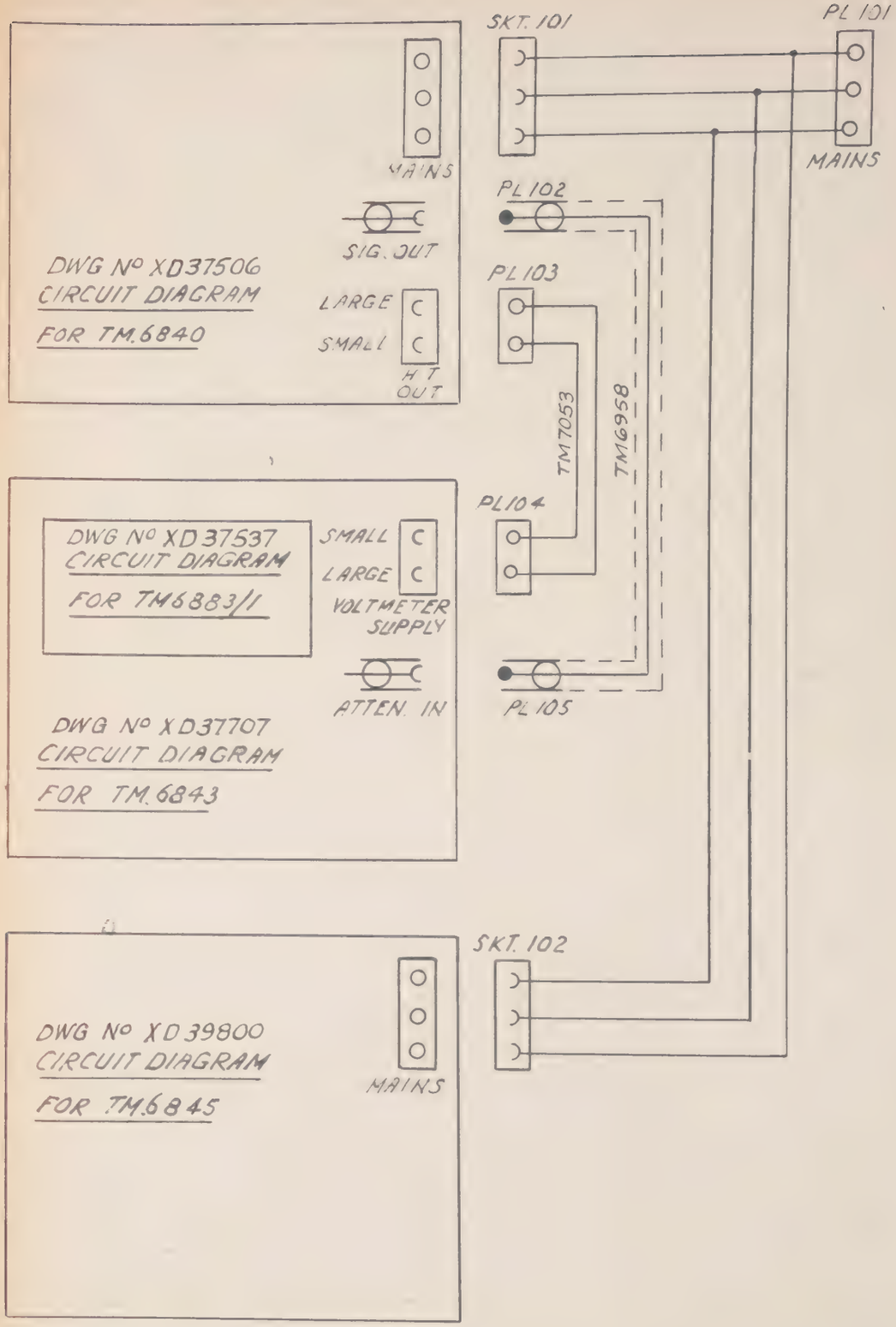
Amplifier bias

Measure the output stage collector voltage by connecting a voltmeter between chassis and the junction of the collectors of VT11 and VT12. Adjust RV2 to give a voltmeter reading of 7.25V; take care to avoid the false setting where VT12 is bottomed. In this condition adjustment of RV2 will be found to be much more critical.

Frequency response

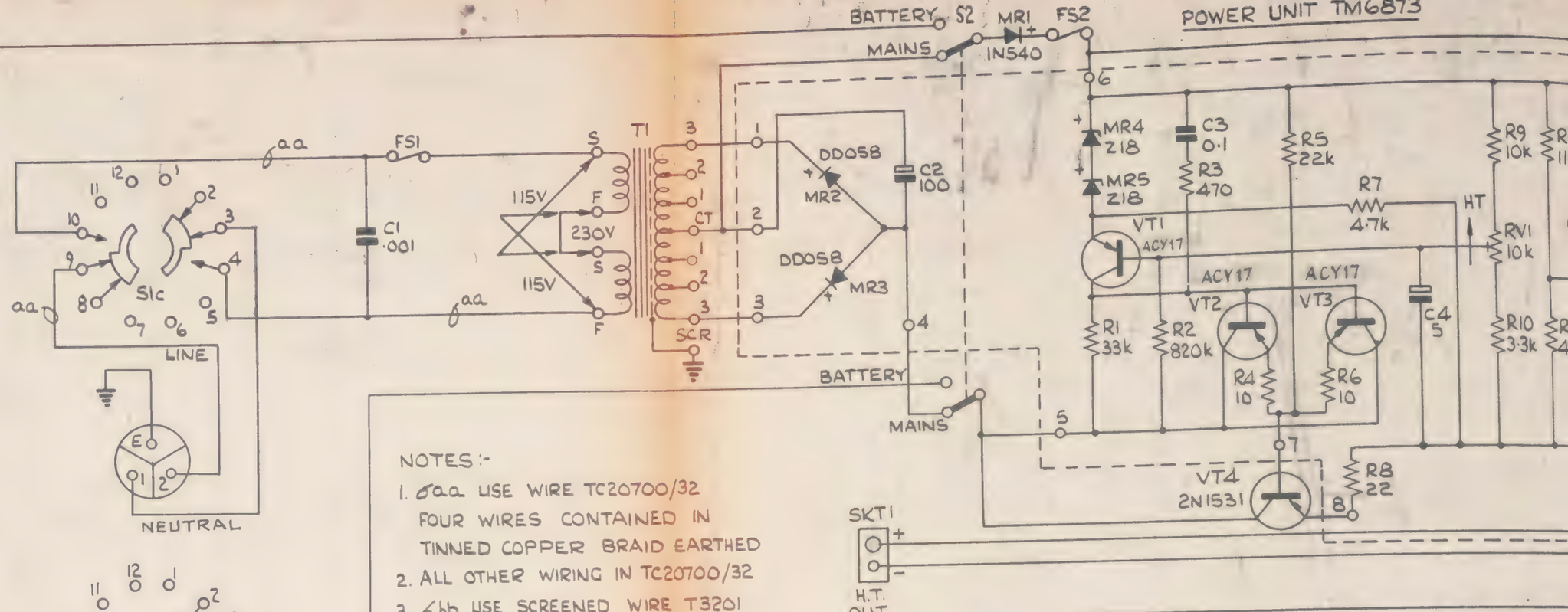
Turn the LOAD IMPEDANCE switch to 75Ω UNBAL. Feed a 1 kc/s sinewave into the level meter and adjust its amplitude (measured on an external standardized meter) to 0.274V (0 dBm). Adjust the SET CAL control for an indication of 0 dBm on the meter. Change the frequency of the input signal to 560 kc/s maintaining the same amplitude. Adjust C7 to give a level reading of 0 dBm (±0.5 dB).

Repeat this procedure with the LOAD IMPEDANCE switch at 150Ω BAL, an input level of 0.388V and adjusting C9 at 560 kc/s.



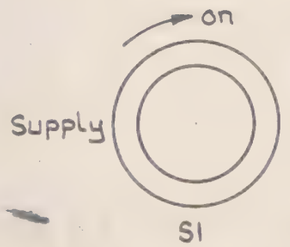
TITLE: A.F. TRANSMISSION MEASURING SET							
DRAWN	DATE	CHKD	APPD.	TRC'D.	ASSEMBLY	STOCK LIST	DRAWING NUMBER
M.E.LANGAN	13·11·61			H.F.	TE.40067	TF.2332	XC 40071
MARCONI INSTRUMENTS LTD.							SHEET / OF / SHEETS

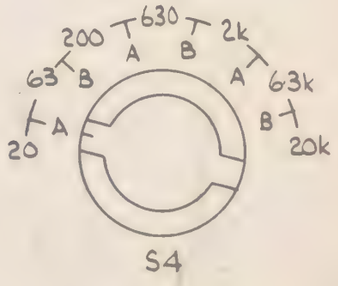
POWER UNIT TM6873



NOTES :-

1. aa USE WIRE TC20700/32 FOUR WIRES CONTAINED IN TINNED COPPER BRAID EARTHED
2. ALL OTHER WIRING IN TC20700/32
3. bb USE SCREENED WIRE T3201 (B.I.C.C. LTD.)





TITLE
CIRCUIT DIAGRAM FOR A.F. OSCILLATOR

DRAWN	DATE	CHKD.	APPD.	TRC'D.	ASSEMBLY	STOCK LIST	DRAWING NUMBER
M.E.LANGAN	12-2-62	T.W.R.	AH	E.M.M.	TE37505	TM6840	XD37506

MARCONI INSTRUMENTS LTD. — SHEET 1 OF 1 SHEETS

A | B | C | D | E

AMPLIFIER
TM6879

VT7 2S104
R21 100k
R26 33k
R31 47
R32 13k
2N696 VT10
C12 100
R45 1k
TEST POINT 2
SKT2
SIG OUT
bb
C16 100
REAR
S3
600Ω TP3
PANEL
R39 100k
TP4
E
R17 22k
C7 .01
R20 3.3k
R22 47k
R25 1k
C9 25
2S703 VT5
2S104 VT6
2S104 VT8
2S103 VT9
R18 2.2k
R24 100
R28 100
IN540 MR7
IN63 MR8
C14 100
R38 600
20
RV2a
RV2b
R13 100
TEST POINT 1
R19 10k
R14 6.8k
R15 33k
C6 5
R23 6.8k
R27 4.7k
MR6 IN63
C10 5
VT11 2N696
R34 15k
TH1
R46 10
R36 5.6k
R 35 1k
TH2
R37 1k
R29 22k
R30 82
R33 1k
C11 10P
C15 1000
600Ω T-PAD
SET OUTPUT
RV2c
21
C8 50
9
11
13
14
15
16
17
18
19

POT MOUNTING BOARD
TM7016

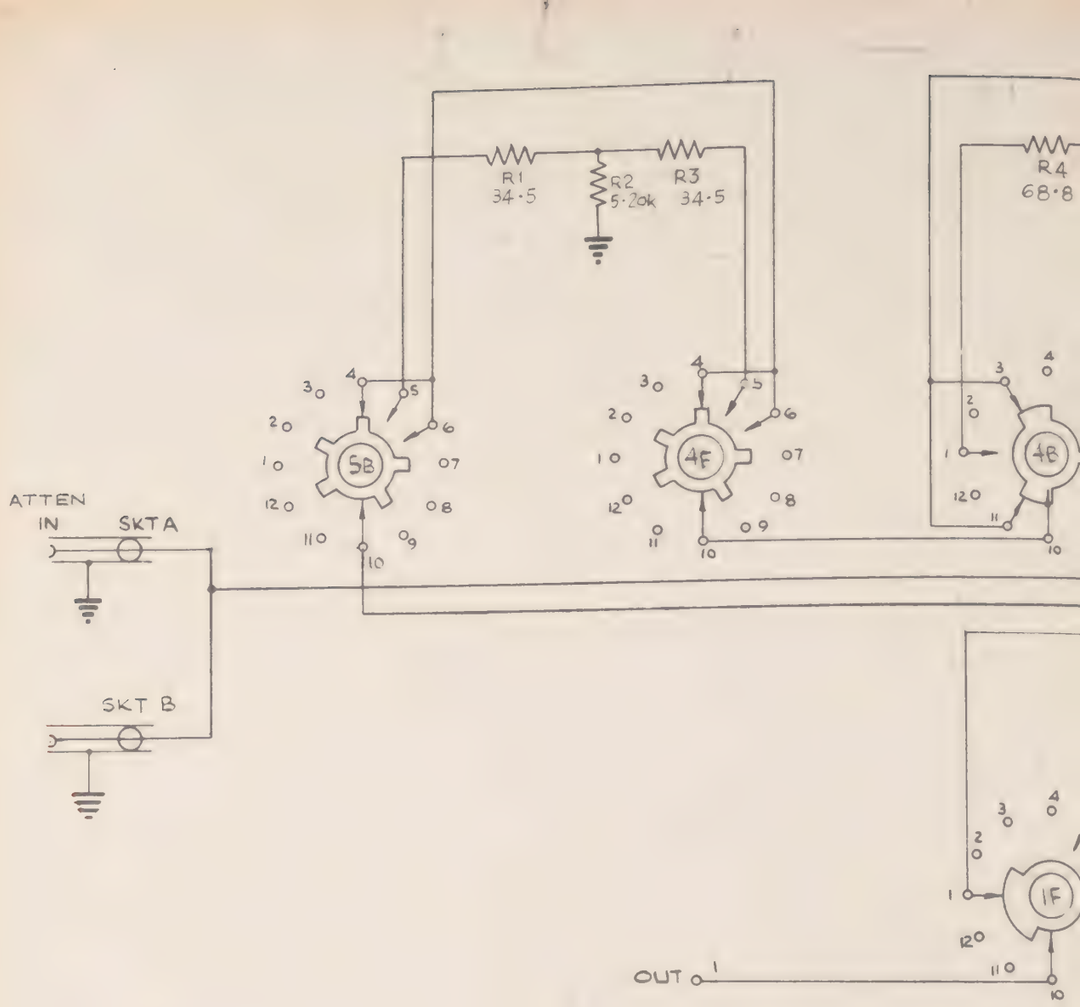
GAIN
RV3 1k
BIAS
RV4 4.7k
RV5 1k
LEVEL

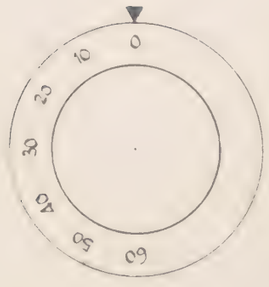
POT BOARD TM6881

X1
X10
X100
A
B
HI
RV8 470
RV9 470
RV10 470
RV11 470
RV12 470
RV13 470
LO
RV14 220k
RV15 220k
RV16 220k
RV17 220k
RV18 220k
RV19 220k

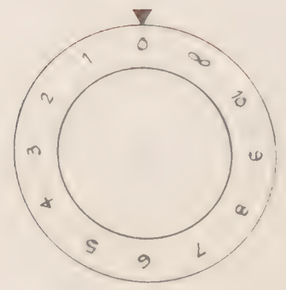
C24 1750p
C25 5600p
C26 .01771
C27 .056
C28 0.1771
C29 0.56
C20 .056
S4b
S4g
S4j
RV6b 10k
R42 3860
R41 3860
RV6a 10k
R16 10k
C13 220p
TUNING
RV6c 5k
FINE TUNE
R43 1675
RV7 100
R44 33k

XD37506 9



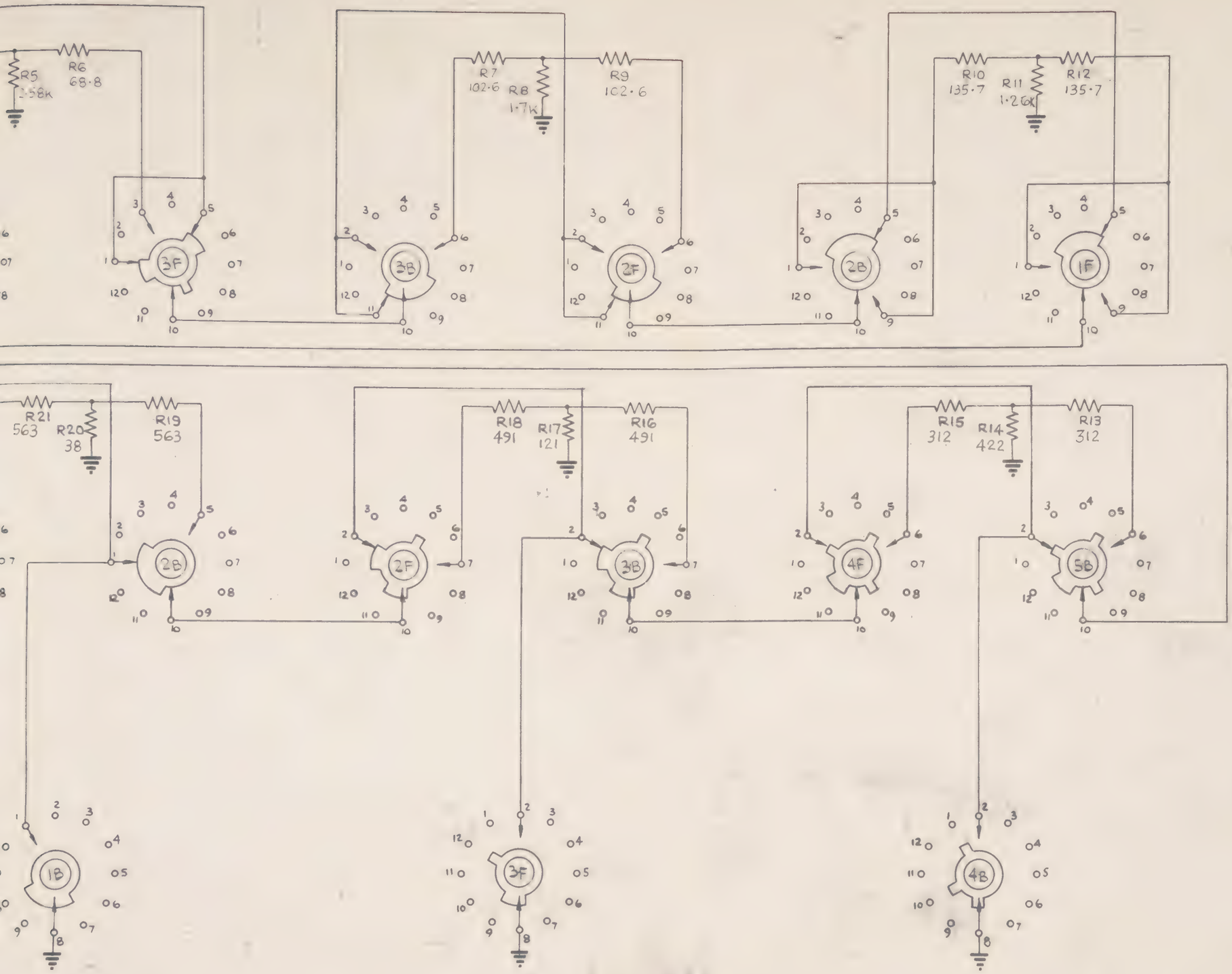


SA



SB

TITLE	CIRCUIT DIAGRAM FOR 70 dB ATTENUATOR						
DRAWN	DATE	CHKD.	APPD.	TRC'D.	ASSEMBLY	STOCK LIST	DRAWING NUMBER
J.A.McH	29·11·61			E.M.T.		TM6883/1	XD37537
MARCONI INSTRUMENTS LTD.							SHEET OF SHEETS


R5
2·58K
R6
68·8
3F
R7
102·6
R8
1·7K
R9
102·6
3B
2F
R10
135·7
R11
1·26K
R12
135·7
2B
1F
SB
R21
563
R20
38
R19
563
2B
R18
491
R17
121
R16
491
2F
3B
R15
312
R14
422
R13
312
4F
5B
SA
1B
3F
4B
XD 37537

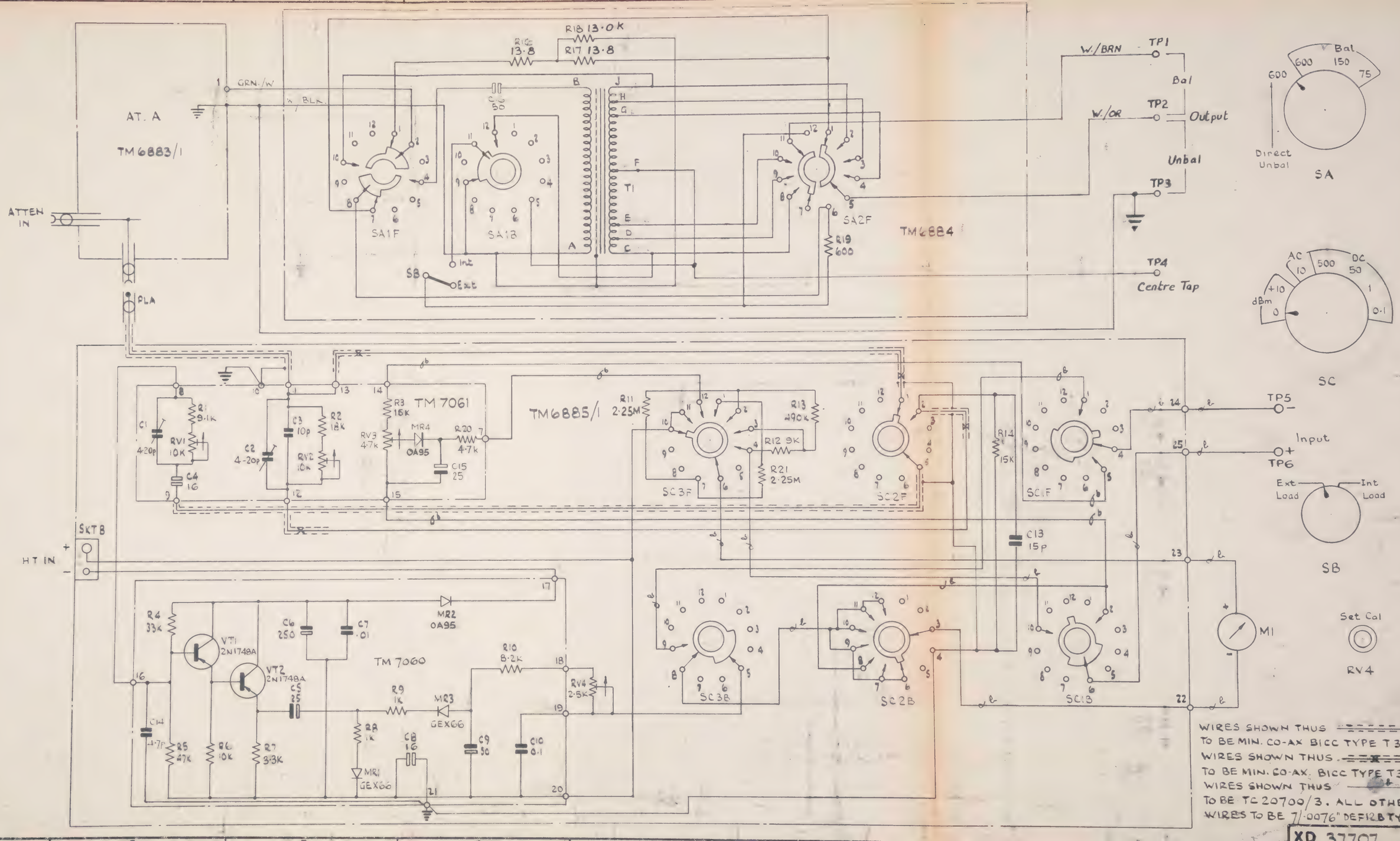
TITLE

CIRCUIT DIAGRAM FOR BASIC OUTPUT ATTENUATOR

DRAWN	DATE	CHKD.	APPD.	TRC'D.	ASSEMBLY	STOCK LIST	DRAWING NUMBER
D.G. HALL	9·3·62			E.M.T.	TE 37706	TM6843	XD37707

MARCONI INSTRUMENTS LTD.

SHEET 1 OF 1 SHEETS


AT. A
TM6883/1
ATTEN IN
PLA
GRN./W
BLK.
R18 13·0K
R16 13·8
R17 13·8
C5 50
SA1F
SA1B
SA2F
SB
Int
Ext
TM6884
R19 600
W./BRN
W./OR
TP1
TP2
TP3
TP4
Bal
Output
Unbal
Centre Tap
Bal
600
150
75
Direct Unbal
SA
AC
DC
10
500
50
1
0·1
+10
dBm
0
SC
TM6885/1
TM 7061
C1 4-20p
RV1 10K
C4 16
R1 9·1K
C2 4-20p
C3 10p
R2 18K
RV2 10K
R3 15K
RV3 4·7K
MR4 OA95
R20 4·7K
C15 25
R11 2·25M
R13 490K
R12 9K
R21 2·25M
SC3F
SC2F
R14 15K
SC1F
TP5
Input
TP6
Ext Load
Int Load
SB
C13 15P
SKT8
HT IN
+
−
TM 7060
R4 33K
VT1 2N1748A
VT2 2N1748A
C6 250
C7 ·01
MR2 OA95
R10 8·2K
RV4 2·5K
C14 47P
R5 47K
R6 10K
R7 3·3K
C5 25
R9 1K
MR3 GEX66
R8 1K
MR1 GEX66
C8 16
C9 50
C10 0·1
SC3B
SC2B
SC1B
M1
Set Cal
RV4
WIRES SHOWN THUS ——— TO BE MIN. CO-AX BICC TYPE T3188.
WIRES SHOWN THUS ——— TO BE MIN. CO-AX. BICC TYPE T3201.
WIRES SHOWN THUS ——— TO BE TC 20700/3. ALL OTHER WIRES TO BE 7/·0076" DEF12B TYPE 1
XD 37707

1

2

3

4

5

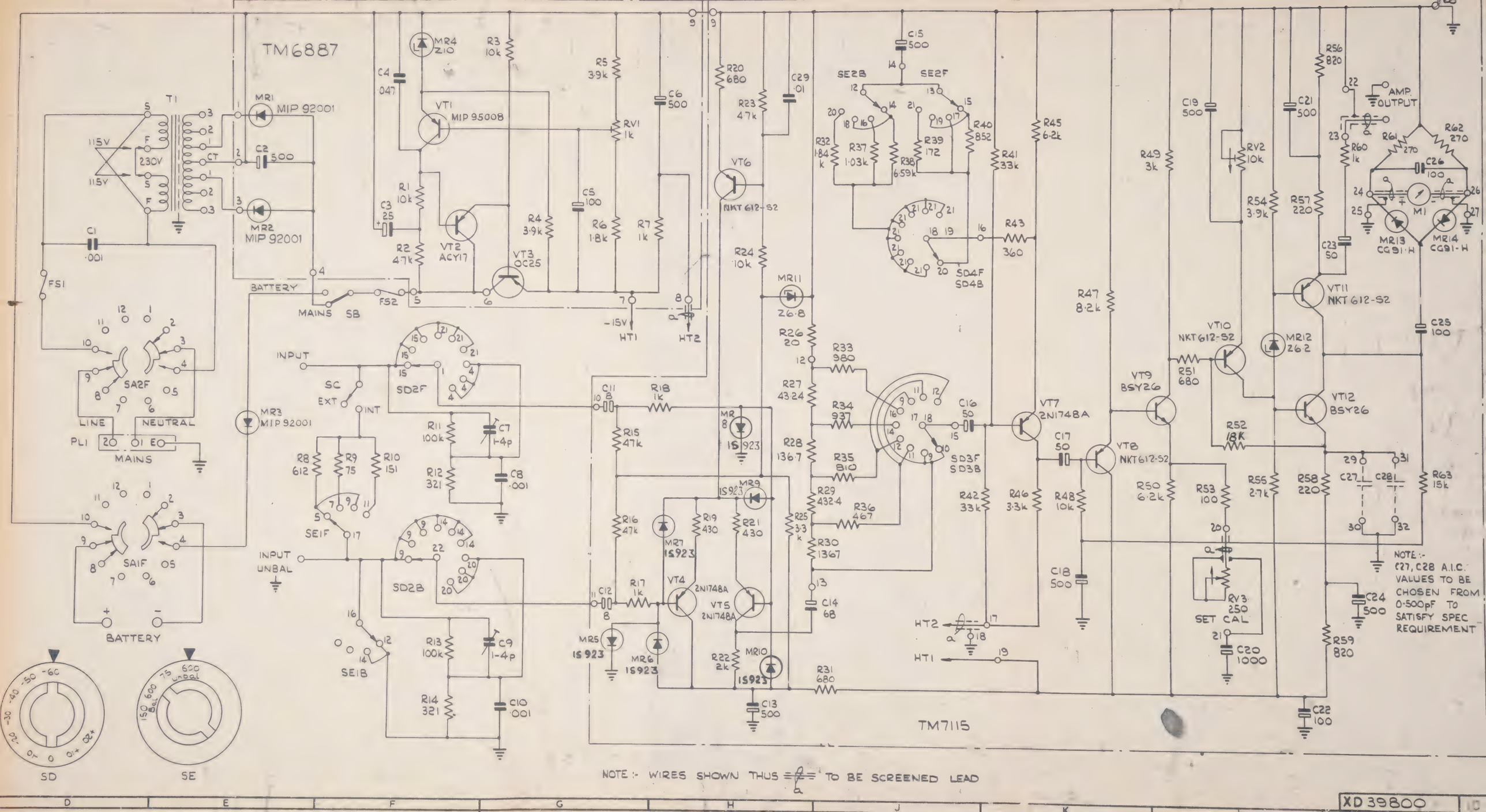
TITLE

CIRCUIT DIAGRAM OF LEVEL METER

DRAWN	DATE	CHKD.	APPD.	TRCD.	ASSEMBLY	STOCK LIST	DRAWING NUMBER.
R.D.THOMAS	2-1-63			E.M.M.	TE39452	TM6845	XD39800

MARCONI INSTRUMENTS LTD.

SHEET 1 OF 1 SHE


TM6887
T1
MR1 MIP 92001
MR2 MIP 92001
MR3 MIP 92001
MR4 Z10
VT1 MIP 95008
VT2 ACY17
VT3 OC25
VT4 2N1748A
VT5 2N1748A
VT6 NKT 612-S2
VT7 2N1748A
VT8 NKT 612-S2
VT9 BSY26
VT10 NKT 612-S2
VT11 NKT 612-S2
VT12 BSY26
MR5 IS923
MR6 IS923
MR7 IS923
MR8 IS923
MR9 IS923
MR10 IS923
MR11 Z6·8
MR12 Z6·2
MR13 CG91·H
MR14 CG91·H
M1
FS1
FS2
SA2F
SA1F
SB
SC
SD2F
SD2B
SE1F
SE1B
SE2B
SE2F
SD4F
SD4B
SD3F
SD3B
RV1 1k
RV2 10k
RV3 250
SET CAL
INPUT
INPUT UNBAL
EXT
INT
MAINS
BATTERY
LINE
NEUTRAL
PL1
HT1
HT2
-15V
AMP. OUTPUT
SD
SE
TM7115
NOTE :- C27, C28 A.I.C. VALUES TO BE CHOSEN FROM 0-500pF TO SATISFY SPEC REQUIREMENT
NOTE :- WIRES SHOWN THUS ≡a≡ TO BE SCREENED LEAD

XD 39800

ISSUE Nº 2

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.	CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	PLUGS						
PL 101	3 - PIN	F1	44/TF2332				
PL 102	CO-AXIAL	E2	1/TM6958				
PL 103	2 - PIN	E2	1/TM7053				
PL 104	2 - PIN	E3	1/TM7053				
PL 105	CO-AXIAL	E3	1/TM6958				
	SOCKETS						
SKT 101	3 - WAY	E1	3/TM4726/226				
SKT 102	3 - WAY	E4	3/TM4726/225				

DRAWN M.E.L.	CHKD.	USED ON TF 2332	COMPONENT LIST XC 40071
DATE 22.2.63	APPD.	SHT. 1 OF 1 SHTS.	
TRACED. PKY	MARCONI INSTRUMENTS LTD.		

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	RESISTORS		
R1	33KΩ ± 10% ½W	E2	2/TM 6873
R2	820KΩ ± 10% ½W	E2	3/TM 6873
R3	470Ω ± 10% ½W	E2	4/TM 6873
R4	10Ω ± 10% ½W	F2	5/TM 6873
R5	22KΩ ± 10% ½W	F2	6/TM 6873
R6	10Ω ± 10% ½W	F2	5/TM 6873
R7	4·7KΩ ± 10% ½W	F2	7/TM 6873
R8	22Ω ± 10% ½W	F2	8/TM 6873
R9	10KΩ ± 10% ½W	F1	9/TM 6873
R10	3·3KΩ ± 10% ½W	F2	10/TM 6873
R11	11·75KΩ ± 1% ⅛W H.S.	G1	11/TM 6873
R12	4KΩ ± 1% ¼W H.S.	G2	12/TM 6873
R13	100Ω ± 10% ¼W/70°C H.S.	G2	14/TM 6879
R14	6·8KΩ ± 7% TE ⅜W	G2	15/TM 6879
R15	33KΩ ± 7% TE ⅜W HS	G2	16/TM 6879
R16	10KΩ ± 7% TE ⅜W HS	K4	47/TM 6840
R17	22KΩ ± 10% ½W	H1	4/TM 6873
R18	2·2KΩ ± 10% ¼W/70°C	H2	23/TM 6879
R19	10KΩ ± 10% ½W	H2	6/TM 6873
R20	3·3KΩ ± 10% ½W	H2	7/TM 6873
R21	100KΩ ± 10% ½W	J1	8/TM 6879
R22	47KΩ ± 10% ½W	J2	3/TM 6879
R23	6·8KΩ ± 10% ½W	J2	9/TM 6879
R24	100Ω ± 10% ¼W/70°C	J2	14/TM 6879
R25	1KΩ ± 10% ½W	J2	5/TM 6879
R26	33KΩ ± 7% TE ⅜W HS	J1	16/TM 6879

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
R27	4·7KΩ ± 7% TE ⅜W HS	J2	11/TM 6879
R28	100Ω ± 10% ¼W/70°C	K2	14/TM 6879
R29	22KΩ ± 10% ½W	K2	4/TM 6879
R30	82Ω ± 7% TE ⅜W HS.	K2	22/TM 6879
R31	47Ω ± 10% ½W	K1	12/TM 6879
R32	13KΩ ±7% TE ⅜W/55°C H.S.	K1	18/TM 6879
R33	1KΩ ± 7% TE ⅜W H.S.	K2	19/TM 6879
R34	15KΩ ±7% TE ⅜W H.S.	K2	20/TM 6879
R35	1KΩ ± 10% ½W	L2	5/TM 6879
R36	5·6KΩ ± 10% ½W	L2	13/TM 6879
R37	1KΩ ± 10% ½W	L3	5/TM 6879
R38	600Ω ± 1% ¼W H.S.	L2	21/TM 6879
R39	100KΩ ± 10% ½W	M2	48/TM 6840
R40			
R41	3060Ω ± ½% ¼W H.S.	J4	7/TM 7057
R42	3060Ω ± ½% ¼W H.S.	J4	7/TM 7057
R43	16750Ω ± ½% ¼W H.S.	J3	8/TM 7057
R44	33KΩ ± 7% TE ⅜W HS	J3	6/TM 7057
R45	1KΩ ± 10% ½W	K1	5/TM 6879
R46	10Ω ± 10% ¼W/70°C	L2	24/TM 6879

DRAWN M.E.L.	CHKD	USED ON TM 6040	COMPONENT LIST XD 37506
DATE 14:2:62.	APPD.	SHT. 1 OF 4 SHTS.	
TRACED A.W.	MARCONI INSTRUMENTS LTD.		

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	RESISTORS VARIABLE		
RV1	10KΩ ± 20% ¼W	F2	17/TM 6873
RV2A	600Ω "T" PAD	L2	51/TM 6840
RV2B		M2	51/TM 6840
RV2C		L3	51/TM 6840
RV3	1KΩ ± 20% ¼W	H4	2/TM 7016
RV4	4·7KΩ ± 20% ¼W	K4	3/TM 7016
RV5	1KΩ ± 20% ¼W	L4	2/TM 7016
RV6A	10KΩ ± 2% 4W	J4	52/TM 6840
RV6B	10KΩ ± 2% 4W	J4	52/TM 6840
RV6C	10KΩ ± 2% 4W	J5	52/TM 6840
RV7	100Ω ± 10% 1W	J5	53/TM 6840
RV8	470Ω ± 20% ¼W	L4	2/TM 6881
RV9	470Ω ± 20% ¼W	L4	2/TM 6881
RV10	470Ω ± 20% ¼W	L4	2/TM 6881
RV11	470Ω ± 20% ¼W	L4	2/TM 6881
RV12	470Ω ± 20% ¼W	M4	2/TM 6881
RV13	470Ω ± 20% ¼W	M4	2/TM 6881
RV14	220KΩ ± 20% ¼W	L5	3/TM 6881
RV15	220KΩ ± 20% ¼W	L5	3/TM 6881
RV16	220KΩ ± 20% ¼W	L5	3/TM 6881
RV17	220KΩ ± 20% ¼W	L5	3/TM 6881
RV18	220KΩ ± 20% ¼W	M5	3/TM 6881
RV19	220KΩ ± 20% ¼W	M5	3/TM 6881
	CAPACITORS		
C1	·001μF ± 20% 300VAC	C2	55/TM 6840
C2	100μF $^{-20\%}_{+50\%}$ 25V	E1	20/TM 6871
C3	·1μF ± 20% 150V	C1	21/TM 6871
C4	5μF $^{-20\%}_{+100\%}$ 70V	F2	22/TM 6871
C5	100μF $^{-20\%}_{+50\%}$ 25V	G2	20/TM 6871
C6	5μF $^{-20\%}_{+100\%}$ 50V	H2	26/TM 6871
C7	·01μF ± 20% 400V	H2	36/TM 6871
C8	50μF $^{-20\%}_{+100\%}$ 12V	H3	30/TM 6875
C9	25μF $^{-20\%}_{+100\%}$ 25V	J2	31/TM 6871
C10	5μF $^{-20\%}_{+100\%}$ 50V	J2	28/TM 6875
C11	10pF ± 0·5pF 750V	J3	29/TM 6871
C12	100μF $^{-20\%}_{+50\%}$ 15V	K1	32/TM 6873
C13	220pF ± 20% 500V	K4	57/TM 6840
C14	100μF $^{-20\%}_{+100\%}$ 50V	K2	34/TM 6873
C15	1000μF $^{-20\%}_{+50\%}$ 12V	K3	33/TM 6879
C16	100μF $^{-20\%}_{+100\%}$ 25VRFV	M2	56/TM 6840
C17A	1·771μF ± 1% 50V	F4	7/TM 6880
C17B	(MATCHED SET)	F5	7/TM 6880
C17C		F5	7/TM 6880
C17D		F5	7/TM 6880

DRAWN M.E.L.	CHKD	USED ON TM 6040.	COMPONENT LIST XD 37506
DATE 14:2:62	APPD.	SHT. 2 OF 4 SHTS.	
TRACED A.W.	MARCONI INSTRUMENTS LTD.		

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	CAPACITORS		
C18	·56μF ± 1% 50V	F5	10/TM 6880
C19	·1771μF ± 1% 50V	G5	11/TM 6880
C20	·056μF ± 1% 50V	G5	12/TM 6880
C21	·01771μF ± 1% 50V	E5	13/TM 7057
C22	5600pF ± 1% 50V	D5	14/TM 7057
C23	1750pF ± 1% 125V	D5	15/TM 7057
C24	1750pF ± 1% 125V	H4	15/TM 7057
C25	5600pF ± 1% 50V	H4	14/TM 7057
C26	·01771μF ± 1% 50V	H5	13/TM 7057
C27	·056μF ± 1% 50V	H5	12/TM 6880
C28	·1771μF ± 1% 50V	H5	11/TM 6880
C29	·56μF ± 1% 50V	H6	10/TM 6880
	TRANSISTORS		
VT1	ACY 17	E2	25/TM 6873
VT2	ACY 17	F2	25/TM 6873

CIR. REF.	DESCRIPTION	GRID	STOCK LIST R
VT3	ACY 17	F2	25/TM 687
VT4	2N[illegible]	F3	59/TM 684
VT5	2S703	G2	39/TM 687
VT6	2S104	H2	40/TM 687
VT7	2S104	H1	40/TM 687
VT8	2S104	J2	40/TM 687
VT9	2S103	J2	41/TM 687
VT10	2N696	K2	42/TM 687
VT11	2N696	K2	42/TM 687
	DIODES		
MR1	IN540 [illegible]	E1	61/TM 684
MR2	DDD 58	D1	27/TM 687
MR3	DDD 58	D2	27/TM 687
MR4	Z18 ± 5%	E1	28/TM 687
MR5	Z18 ± 5%	E2	28/TM 687
MR6	IN 63	J2	45/TM 687
MR7	IN 540	K2	47/TM 687
MR8	IN 63	K2	46/TM 687

DRAWN M.E.L.	CHKD	USED ON TM 6840	COMPONENT LIST XD37506___
DATE 14:2:62.	APPD.	SHT. 3 OF 4 SHTS.	
TRACED A.W.	MARCONI INSTRUMENTS LTD.		

ISSUE NO. 2

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	SWITCHES		
S1A	2 SEC. 2 POS.	B4	22/TM 6840
S1C		B2	22/TM 6840
S2	D.P.D.T.	E1	64/TM 6840
S3	D.P.D.T.	M2	65/TM 6840
S4B	5 SEC. 6 POS.	H4	1/TM 7057
S4C		D5	1/TM 7057
S4D		E5	1/TM 7057
S4E		D4	1/TM 7057
S4F		E4	1/TM 7057
S4G		K5	1/TM 7057
S4J		K5	1/TM 7057
	TRANSFORMERS		
T1	MAINS	D2	5/TM 6840
	FUSES		
FS1	100MA OR 250MA	C1	71/TM 6840
FS2	250MA	E1	72/TM 6840
	SOCKETS		
SKT1	2-WAY	D3	68/TM 6840
SKT2	CO-AXIAL	M1	66/TM 6840

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	PLUGS		
PL1	3 PIN	B2	67/TM 6840
	THERMISTORS		
TH1	A54	L2	48/TM 6877
TH2	C23	L3	49/TM 6877
	TERMINALS		
TP1		B4	21/TM 6840
TP2		B4	21/TM 6840
TP3		M2	21/TM 6840
TP4		M2	21/TM 6840

DRAWN M.E.L.	CHKD	USED ON TM 6840	COMPONENT LIST XD37506
DATE 14:2:62.	APPD.	SHT. 4 OF 4 SHTS.	
TRACED		MARCONI INSTRUMENTS LTD.	

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	RESISTORS		
R1	34·5Ω ± 1% ¼W	E1	15 TM 6918/1
R2	5·20KΩ ± 1% ¼W	E1	23 TM 6818/1
R3	34·5Ω ± 1% ¼W	F1	15 TM 6918/1
R4	68·8Ω ± 1% ¼W	G1	17 TM 6918/1
R5	2·58KΩ ± 1% ¼W	G1	22 TM 6918/1
R6	68·8Ω ± 1% ¼W	G1	17 TM 6918/1
R7	102·6Ω ± 1% ¼W	J1	18 TM 6918/1
R8	1·7 KΩ ± 1% ¼W	J1	21 TM 6918/1
R9	102·6Ω ± 1% ¼W	J1	18 TM 6918/1
R10	135·7Ω ± 1% ¼W	L1	20 TM 6918/1
R11	1·26KΩ ± 1% ½W	L1	33 TM 6918/1
R12	135·7Ω ± 1% ¼W	L1	20 TM 6918/1
R13	312Ω ± 1% 1W	L3	38 TM 6918/3
R14	422Ω ± 1% ½W	L3	32 TM 6918/3
R15	312Ω ± 1% 1W	L3	38 TM 6918/3
R16	491Ω ± 1% 1W	J3/K3	39 TM 6918/3
R17	121Ω ± 1% ¼W	J3	19 TM 6918/3
R18	491Ω ± 1% 1W	J3	39 TM 6918/3
R19	563Ω ± 1% 1W	H3	40 TM 6918/3
R20	38·0Ω ± 1% ¼W	G3	16 TM 6918/3
R21	563Ω ± 1% 1W	G3	40 TM 6918/3

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	SWITCHES		
SA1F 1-12	5 SEC; 7 POS.	G4	3 TM 6918/
SA1B 1-12		G5	
SA2F 1-12		H4/J4	
SA2B 1-12		G4/H4	
SA3F 1-12		J5	
SA3B 1-12		J4/K4	
SA4F 1-12		K4	
SA4B 1-12		L5	
SA5B 1-12		L4	

DRAWN D.R.H.	CHKD	USED ON TM6883/1	COMPONENT LIST XD 37537
DATE 29:11:61.	APPD.	SHT. 1 OF 2 SHTS.	
TRACED A.W.	MARCONI INSTRUMENTS LTD.		

ISSUE NO. 2

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.	CIR. REF.	DESCRIPTION	GRID	STOCK LIST R
	SWITCHES (CONT.)						
SB1F 1-12		L2					
SB2F 1-12		J2/K2					
SB2B 1-12		K2					
SB3F 1-12		H2					
SB3B 1-12	5 SEC; 12 POS.	H2/J2	2 TM 6918/1				
SB4F 1-12		F2					
SB4B 1-12		G2					
SB5B 1-12		E2					
	SOCKETS						
SKTA	CO-AXIAL 75Ω	D2	25 TM 6883/1				
SKTB	CO-AXIAL 75Ω	D3	25 TM 6883/1				

DRAWN D.R.H.	CHKD	USED ON TM 6883/1	COMPONENT LIST XD 37537
DATE 29:11:61	APPD.	SHT. 2 OF 2 SHTS.	
TRACED A.W	MARCONI INSTRUMENTS LTD		

ISSUE NO. 5

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	TRANSISTORS		
VT1	2N1748A	E5	29 TM 7060
VT2	2N1748A	F5	29 TM 7060
	DIODES		
MR1	GEX66	F5	26 TM 70[illegible]
MR2	OA95	G5	27 TM 7060
MR3	GEX66	G6	26 TM 7060
MR4	OA95	G4	22. TM 7061
	TRANSFORMERS		
T1	[illegible]	H1 /2	1 TM 6884
	SWITCHES		
SA1F 10-3		F/ G2	
SA1F 4-9		F/ G2	
SA1B 1-12	2 Sec. 4 Pos.	G2	18 TM 6884
SA2F 1-6		J2	
SA2F 7-12		J2	
SB	S.P.C.O.	G2 /3	19 TM 6884
SC1F 1-12		K/ L4	
SC1B 1-12		K/ L5	
SC2F 1-12	2 Sec. 7 Pos.	J/ K4	51 TM 6885/1
SC2B 1-12		J/ K5	
SC3F 1-12		H/ J4	
SC3B 1-12		H/ J5	

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	METERS		
M1		L5	11. TM 6843
	TERMINALS		
TP1		L1	10 TM 6843
TP2		L2	10 TM 6843
TP3		L2	10 TM 6843
TP4		L3	10 TM 6843
TP5		H3	10 TM 6843
TP6		M4	10 TM 6843
	PLUGS.		
PLA	MIN. CO-AXIAL	E3	17 TM4726/1
	SOCKETS		
SKTS	2 Pin	E4 /5	47 TM 6885
	ATTENUATORS		
AT1	TM 6883/1	F1 /2	1 TM 6883

DRAWN P.G. HALL	CHKD	USED ON TM 6843	COMPONENT LIST XD37707
DATE 26:3:62.	APPD.	SHT. 1 OF 2 SHTS.	
TRACED A.W.	MARCONI INSTRUMENTS LTD.		

ISSUE NO. 10

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	RESISTORS		
R1	9·1K ± 7% TE ⅜W/55°C	E4	2 TM 7061
R2	18K ± 7% TE ⅜W/55°C	F4	4 TM 7061
R3	15k ± 7% TE ⅜W/55°C	F4	3 TM 7061
R4	33K ± 7% TE ⅜W/55°C	E5	4 TM 7060
R5	47K ± 7% TE ⅜W/55°C	E6	5 TM 7060
R6	10K ± 10% 2W/55°C	E5	7 TM 7060
R7	3·3K ± 7% TE ⅜W/55°C	F6	2 TM 7060
R8	1K ± 10% 2W/55°C	F6	6 TM 7060
R9	1K ± 10% 2W/55°C	F/G6	6 TM 7060
R10	8·2K ± 7% TE ⅜W/55°C	G5	3 TM 7060
R11	2·25M ± 1% ¾W/70°C	H4	33 TM 6885/1
R12	1K ± 1% ½W/70°C	J4	31 TM 6885/1
R13	4·0K ± 1% ½W/70°C	J4	32 TM 6885/1
R14	15K ± [illegible]	K4	29 [illegible]
R15			
R16	13·8Ω ± 1% ½W/70°C	G1	14 TM 6884
R17	13·8Ω ± 1% ½W/70°C	H1	14 TM 6884
R18	13·0KΩ ± 1% ½W/70°C	H1	15 TM 6884
R19	[illegible]Ω ± 1% 1W/70°C	J2	16 TM 6884
R20	4·7k ± 7% TE ⅜W/55°C	G4	5. TM 7061
R21	2·25M ± 1% ¾W/70°C	J4	33.TM6885/1

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	RESISTORS VARIABLE		
RV1	10K ± 20% ½W	E4	6 TM 7061
RV2	10K ± 20% ½W	F4	6 TM 7061
RV3	4·7k ± 20% ½W	F4	7. TM 7061
RV4	2·5K ± 10% 1W	H5	24 TM 6885
	CAPACITORS		
C1	4–20PF TRIMMER	E4	19 TM 7061
C2	4–20PF TRIMMER	F4	19 TM 7061
C3	10PF ± 0·5PF 750V	F4	16 TM 7061
C4	16µF +100% −20% 50V	E4	17 TM 7061
C5	25µF +100% −20% 18V	F6	16 TM 7060
C6	250µF +100% −20% 25V	F5	20 TM 7060
C7	0·1µF ± 10% 400V	F5	18 TM 7060
C8	16µF +100% −20% 50V	G6	21 TM 7060
C9	50µF +100% −20% 25V	G6	17 TM 7060
C10	0·1µF ± 25% 350V	G6	22 TM 7060
C11			
C12			
C13	15PF ± 5% 750V	K4	40 TM 6885/1
C14	4·7PF ± 0·5PF 750V	E6	19 TM 7060
C15	25µF +100% −20% 18V	G4	15.TM 7061
C16	50µF +100% −20% 50V	G1	30.TM 6884

DRAWN D.G. HALL	CHKD [illegible]	USED ON TM 7061	COMPONENT LIST XD 37707
DATE 26:3:62.	APPD. [illegible]	SHT. 1 OF 2 SHTS.	
TRACED [illegible]	MARCONI INSTRUMENTS LTD.		

ISSUE Nº 3

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	RESISTORS.		
R1	10KΩ ± 10% ½W/55°C	F2	6 TM 6887
R2	4·7KΩ ± 10% ½W/55°C	F2	7 TM 6887
R3	10KΩ ± 10% ½W/55°C	G1	6 TM 6887
R4	3·9KΩ ± 10% ½W/55°C	G2	8 TM 6887
R5	3·9KΩ ± 7%TE ⅜W/55°C	G1	9 TM 6887
R6	1·8KΩ ± 7%TE ⅜W/55°C	G2	10 TM 6887
R7	1KΩ ± 10% ½W/55°C	H2	11 TM 6887
R8	612Ω ± 1% ½W/70°C	E4	34 TM 6845
R9	75Ω ± 1% ½W/70°C	F4	35 TM 6845
R10	151Ω ± 1% ½W/70°C	F4	36 TM 6845
R11	100KΩ ± ½% ½W/70°C	F4	37 TM 6845
R12	321Ω ± ½% ½W/70°C	F4	38 TM 6845
R13	100KΩ ± ½% ½W/70°C	F5	37 TM 6845
R14	321Ω ± ½% ½W/70°C	F6	38 TM 6845
R15	47KΩ ± 10% ½W/55°C	G4	6 TM 7114
R16	47KΩ ± 10% ½W/55°C	G4	6 TM 7114
R17	1KΩ ± 5% 2W/70°C	G5	7 TM 7114
R18	1KΩ ± 5% 2W/70°C	H4	7 TM 7114
R19	430Ω ± 7%TE ⅜W/55°C	H4	8 TM 7114
R20	680Ω ± 10% ½W/55°C	H1	9 TM 7114
R21	430Ω ± 7%TE ⅜W/55°C	H4	8 TM 7114
R22	2KΩ ± 1% ¼W/70°C	H5	10 TM 7114
R23	4·7KΩ ± 10% ½W/55°C	H1	11 TM 7114
R24	10KΩ ± 10% ½W/55°C	H3	12 TM 7114
R25	3·3KΩ ± 10% ½W/55°C	H4	13 TM 7114
R26	20Ω ± ½% ⅓W/70°C	H3	14 TM 7114
R27	43·24Ω ± ½% ⅓W/70°C	H3 H4	39 TM 6845
R28	136·7Ω ± ½% ⅓W/70°C	H4	40 TM 6845
R29	432·4Ω ± ½% ⅓W/70°C	H4	41 TM 6845
R30	1367Ω ± ½% ⅓W/70°C	H5	42 TM 6845
R31	680Ω ± 10% ½W/55°C	J6	9 TM 7114
R32	1·84KΩ ± 1% ¼W/70°C	J2	43 TM 6845
R33	980Ω ± 1% ¼W/70°C	J3	44 TM 6845
R34	937Ω ± 1% ¼W/70°C	J4	45 TM 6845
R35	810Ω ± 1% ¼W/70°C	J4	46 TM 6845
R36	467Ω ± 1% ¼W/70°C	J4	47 TM 6845
R37	1·03KΩ ± 1% ¼W/70°C	J2	48 TM 6845
R38	6·59K ± 1% ¼W/70°C	J2	49 TM 6845
R39	172Ω ± 1% ¼W/70°C	J2	50 TM 6845
R40	852Ω ± 1% ¼W/70°C	J2	51 TM 6845
R41	33KΩ ± 10% ½W/55°C	K2	15 TM 7114
R42	33KΩ ± 10% ½W/55°C	K4	15 TM 7114
R43	360Ω ± 1% ¼W/70°C	K2	16 TM 7114
R44			
R45	6·2KΩ ± 1% ¼W/70°C	K2	18 TM 7114
R46	3·3KΩ ± 7%TE ⅜W/55°C	K4	19 TM 7114
R47	8·2KΩ ± 10% ½W/55°C	K3	20 TM 7114
R48	10KΩ ± 10% ½W/55°C	K4	12 TM 7114
R49	3KΩ ± 7%TE ⅜W/55°C	L2	21 TM 7114
R50	6·2KΩ ± 7%TE ⅜W/55°C	L4	22 TM 7114
R51	680Ω ± 10% ½W/55°C	L3	23 TM 7114
R52	18KΩ ± 7%TE ⅜W/55°C	L4	24 TM 7114
R53	100Ω ± 10% ½W/55°C	L4	25 TM 7114

DRAWN R.THOMAS.	CHKD.	USED ON TM6845	COMPONENT LIST XD39800
DATE 21.12.62.	APPD.	SHT. 1 OF 4 SHTS.	
TRACED. PKY	MARCONI INSTRUMENTS LTD.		

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
R54	3·9KΩ ± 7% ⅜W/55°C	L2	26 TM7114
R55	2·7KΩ ±7%TE ⅜W/55°C	L4	27 TM7114
R56	820Ω ±7%TE ⅜W/55°C	L1 M1	28 TM7114
R57	220Ω ±7%TE ⅜W/55°C	L2 M2	29 TM7114
R58	220Ω ±7%TE ⅜W/55°C	L4 M4	29 TM7114
R59	820Ω ±7%TE ⅜W/55°C	L5 M5	28 TM7114
R60	1KΩ ± 10% ½W/55°C	M2	30 TM7114
R61	270Ω ±7%TE ⅜W/55°C	M2	31 TM/114
R62	270Ω ±7%TE	M3	31 TM7114
R63	15KΩ ± 10%	M4	32 TM7114
	RESISTORS VARIABLE		
RV1	1KΩ ±20% ½W/70°C	G2	15 TM6887
RV2	10KΩ ±20% ½W/ 70°C	L2	37 TM7114
RV3	250Ω ±20% ¼W	L5	57 TM6845
	CAPACITORS		
C1	·001μF ±10% 500V	D2	60 TM6845
C2	500μF +100 -20% 50V	E2	17 TM6887
C3	25μF +100 -20% 70V	F2	21 TM6887
C4	·047μF±20% 200V	F1	19 TM6887

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
C5	100μF +100 -20% 30V	G2	61 TM6887
C6	250μF +50 -20% 12V	H2	59 TM6887
C7	1·0μF ±20% 100V	H4	64 TM6845
C8	500μF +100 -20% 12V	G4	61 TM6845
C11	1·0μF ±20% 100V	G5	64 TM6845
C12	8μF -20% 100V	G5	59 TM7114
C13	100μF -20% 12V	H1	58 TM7114
C14	50μF +100 -20% 25V	H3	60 TM7114
C15	100μF +100 -20% 12V	J1	60 TM7114
C16	10μF +100 -20% 25V	J4	62 TM7114
C17	2·0μF -20% 25V	J1	61 TM7114
C18	50μF -20% 12V	K1	58 TM7114
C19	100μF +100 -20% 12V	K1	60 TM7114
C20	·01μF -20% 25V	L2	63 TM7114
C21	500μF +100 -20% 12V	L1	60 TM7114
C22	10μF +100 -20% 12V	L3	64 TM7114
C23	·01μF -20% 25V	M2	62 TM7114
C27	500μF +100 -20% 12V	M5	60 TM7114
C28	5·1-220pF FROM 0 TO	V4	47 TM7114
C29	0·01μF ± 10% 400V	H1	48 TM 7114

DRAWN R. THOMAS	CHKD.	USED ON TM6545	COMPONENT LIST XD 39800
DATE 21.12.62.	APPD.	SHT. 2 OF 4 SHTS.	
TRACED.	MARCONI INSTRUMENTS LTD.		

ISSUE No 5

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
	←		
	TRANSISTORS		
VT1	MIP 95008	F1	26 TM6887
VT2	ACY17	F2	27 TM6887
VT3	OC25	G3	28 TM6887
VT4	2N1748A	H5	56 TM7114
VT5	2N1748A	H5	58 TM7114
VT6	NKT 612-S2	H2	57 TM7114
VT7	2N1748A	K4	58 TM7114
VT8	NKT 612-S2	K4	57 TM7114
VT9	BSY26	L4	59 TM7114
VT10	NKT 612-S2	L3	57 TM7114
VT11	NKT 612-S2	L3	57 TM7114
VT12	BSY26	L4	59 TM7114
	SWITCHES		
SA1F	2 SEC 2 POS	D5	26 TM6845
SA2F		D3	
SB	S.P.D.T.	F3	69 TM6845
SC	S.P.D.T.	F3	69 TM6845
SD1F	DUMMY WAFER		
SD1B	DUMMY WAFER (4 SEC. 9 POS.)		25 TM 6845
SD2F		F3	

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.
SD2B		F5	
SD3F		J4	
SD3B	(4 SEC. 9 POS.)	J4	25 TM 6845
SD4F		J3	
SD4B		J3	
SE1F		F5	
SE1B	3 SEC.	F5	24 TM 5845
SE2F	4 POS.	J1	
SE2B		J1	
	TRANSFORMERS		
T1	MAINS INPUT 115V & 230V	D2	8 TM6845
	METERS		
M1	500μA 120Ω ± 5%	M2	4 TM6845
	FUSES		
FS1	100MA - 230V 250MA - 115V	D7	24 TM6845
FS2	250MA	F3	15 TM6845
	PLUGS		
PL1	3 PIN 3 AMP	D4	70 TM6845

DRAWN R. THOMAS	CHKD.	USED ON TM6845	COMPONENT LIST XD 39800
DATE 21.12.62.	APPD.	SHT. 3 OF 4 SHTS.	
TRACED.	MARCONI INSTRUMENTS LTD.		

ISSUE Nº 3

CIR. REF.	DESCRIPTION	GRID	STOCK LIST REF.	CIR. REF.	DESCRIPTION	GRID	STOCK LIST RE
	RECTIFIERS.						
MR1	MIP 92001	E1	23 TM 6887				
MR2	MIP 92001	E2	23 TM 6887				
MR3	MIP 92001	E4	67 TM 6845				
MR4	Z10 ± 10%	F1	24 TM 6887				
MR5	IS 923	G5	51 TM 7114				
MR6	IS 923	H5	51 TM 7114				
MR7	IS 923	H5	51 TM 7114				
MR8	IS 923	H4	51 TM 7114				
MR9	IS 923	H4	51 TM 7114				
MR10	IS 923	H6	51 TM 7114				
MR11	Z6·8 ± 10%	H3	52 TM 7114				
MR12	Z6·2 ± 5%	L3	53 TM 7114				
MR13	CG91-H	M2	54 TM 7114				
MR14	CG91-H	M2	54 TM 7114				

DRAWN P. THOMAS.	CHKD.	USED ON TM 6845	COMPONENT LIST XD 39800
DATE 21.12.63.	APPD.	SHT. 4 OF 4 SHTS.	
TRACED. PKY	MARCONI INSTRUMENTS LTD.		

www.manualsplus.com
1003821

Printed in England 5K 9/64 BWL